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Research Article

Traditional cottage cheese production in Kosovo

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Abstract

The study was conducted to identify the technological process of cottage cheese production as well as its diversity produced in traditional way in Kosovo. The data were collected by survey realized during the period October 2015 – April 2016. The sample size was calculated as 450 small-scale households and was randomly selected, representing all regions of Kosovo. The data were collected by face to face survey in rural settlements. The study was focused on the mode of cottage cheese production, as a way of coagulation, pasteurization,storage and use of cottage cheese produced. According to study result, it was found that Kosovo is characterized by a very small diversity of cottage cheese produced in the traditional form and the technological process of curd production differ slightly between the regions of Kosovo (mainly in the way of coagulation of curd).

Keywords: cottage cheese, technological process, diversity, traditional way.

Abbreviations:

BCC - buttermilk cottage cheese

SCC - sweet cottage cheese

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Introduction

Cheese is one of the milk products that enjoy large consumption in Kosovo households. Its production is spread all over Kosovo, and it is an important component of the traditional diet (Bytyqi et al. 2017). Traditional dairy products constitute an important role of Kosovo society, culture, identity, and heritage. According to Avermaete et al. (2004) traditional food products contribute to the development and sustainability of rural areas, protecting them from depopulation, entailing substantial product differentiation potential for producers and processors. Cheese is a dairy product prepared from different type of milk (Thomsen et al. 2012) with the help of rennet, enzymes, and organic acids (Scott et al. 1998). Globally there are over 2000 varieties of cheese (O'Conner 1993). They are classified into various categories, on the basis of appearance, manufacturing, ripening and chemical composition (Walstra et al. 2006), but the common categorization is into natural process, un-ripened, ripened, hard cheese, soft cheese also named for their place of origination (National Dairy Council 2000; Speker 1998). Cottage cheese is an example of a low-fat, soft cheese, generally coagulated with lactic acid rather than rennet (Farkye 2004; Norman and Joseph 1998). Cottage cheese is a fresh cheese curd product, it has a mild flavor that is attributed to milk fat, other milk components, and starter bacteria or acidulate (Walstra et al. 1999; Bodyfelt and Potter 2009). Cottage cheese is defined as "soft uncured cheese prepared by mixing cottage cheese dry curd with a creaming mixture" (Code of Federal Regulations 2004). The curd is left in particular form, is not pressed, it is not aged or ripened (Norman and Joseph 1998). The variations in cottage cheese making have to do with the length of the fermentation on vat. The 14-h holding in 22ºC is known as long-set method and the 5-h in 32ºC is known as short – set method. Other variation is related to low levels of rennet plus the starter for milk coagulation (Lablee 1987; Kosikowski and Mistry 1997). Cottage cheese is used as an ingredient to add sensory appeal, mild flavor, and nutritional value to foods. Cottage cheese is well recognized as being a healthy food, a fact that adds value to its use. A 125 gram serving of cottage cheese (creamed, low fat or dry curd) provides an excellent source of vitamin B12 and a source of calcium, phosphorous, zinc, folate, riboflavin and vitamin B6 (Canadian Dairy Commission 2011)

The aim of this study was to show the technological process of production of cottage cheese in traditional way in Kosovo and its diversity.

Materials and Methods

The research is conducted in 48 villages (Table 1), sample size is calculated 450, which were randomly selected by representing the six regions of Kosovo. The data for this paper come from a survey conducted between October 2015 - April 2016. It was done by face to face surveys in rural settlements, with the use of questionnaires. Questionnaires consisted around 30 general questions about cottage cheese technological process production, that included questions about the raw material, type of cottage cheese produced, the form of production (conventional/industrial), pasteurization of milk, the way of coagulation of milk, formation, produced quantity, it used, manner of storage of cottage cheese produced, etc.

Statistical analyses: The statistical analyses of the data were done by using JMP- starter packet, a business unit of SAS program (Sall et al. 2004).

Table 1. Number of villages/households involved in research

No.	Region	Number of villages	Number of households
1.	Gjilan	8	75
2.	Mitrovice	8	75
3.	Prishtine	8	75
4.	Prizren	8	75
5.	Peje	8	75
6.	Gjakove	8	75
	Total	48	450

Results and Discussion

The number of 345 out of 450 small-scale households involved in this study produced cottage cheese. Table 2 shows the result for the type of cottage cheese produced in traditional way in Kosovo. Two types of cottage cheese

were identified based in their technological process; Sweet cottage cheese (SCC) and buttermilk cottage cheese (BCC). Large amount of the curd produced in traditional way in Kosovo belongs to the group of sweet cottage cheese, found in all regions of Kosovo while in Prizen is produced buttermilk cottage cheese as well. Sweet cottage cheese is prepared from skim milk to 0.5% fat, which is pasteurized at 85°C for several minutes. The pasteurized milk is cooled to 24-25°C, calcium chloride is added, pure lactic culture, yeast or yogurt (Papazis and Hala 1999).

Table 2. Types of cottage cheese produced in traditional way in Kosovo.

No.	Region	Number of types	Cottage cheese type*
1.	Gjilan	1	SCC
2.	Mitrovice	1	SCC
3.	Prishtine	1	SCC
4.	Prizren	2	SCC, BCC
5.	Peje	1	SCC
6.	Gjakove	1	SCC

*Sweet cottage cheese (SCC);Buttermilk cottage cheese (BCC)

Fig. 1 shows the result for milk pasteurization for cottage cheese production in traditional way in Kosovo.

According to the study results 44.9% of surveyed households apply the pasteurization of milk for cottage cheese production (the average of pasteurization temperature that is applied in the interviewed households is 85°C and 55.1% did not apply the milk pasteurization process, that show a low level of pasteurization application. The diversity of

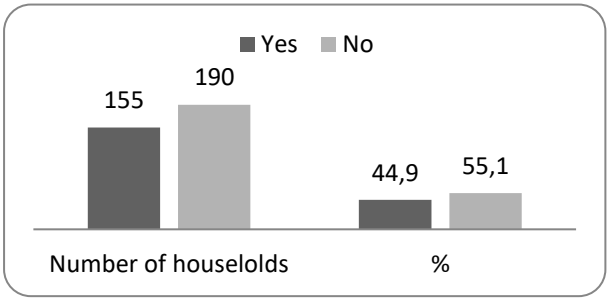


Figure 1. Pasteurization of milk for cottage cheese production in traditional way in Kosovo.

The diversity of cottage cheese produced among Kosovo households is presented in Fig. 2.

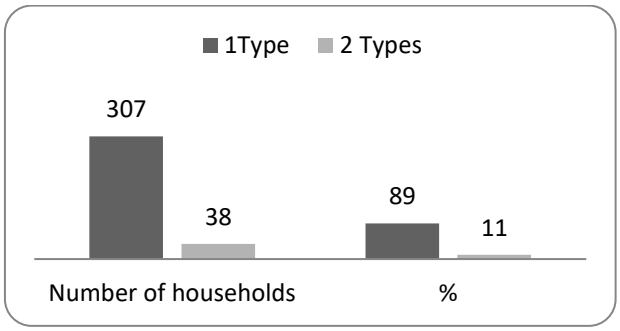


Figure 2. The diversity of cottage cheese share among small-scale households in Kosovo.

Most of Kosovo households produce only one type of cottage cheese (89%), families that produce two types of cottage cheese are identified only in the region of Prizren (11%), and this tells a lack of diversity on cottage cheese production in traditional way. Results of the study shows that households that produce cottage cheese, mainly use it for domestic consumption (51%) but they sale it too (49%) (Fig. 3).

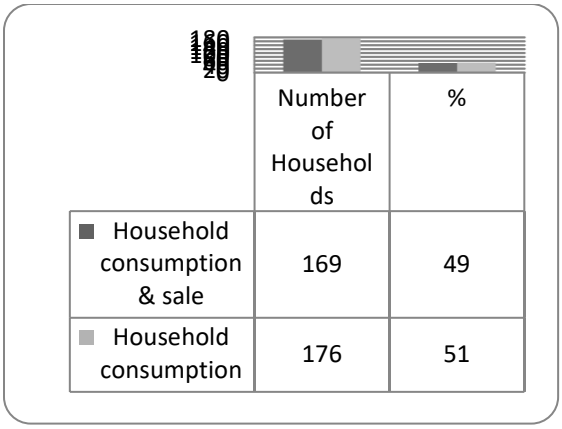


Figure 3. Use of cottage cheese produced.

Places where they sell cottage cheese include restaurants (8%), private houses (16%), markets (20%), individual requests (24%) and retail market (32%) (Fig. 4).

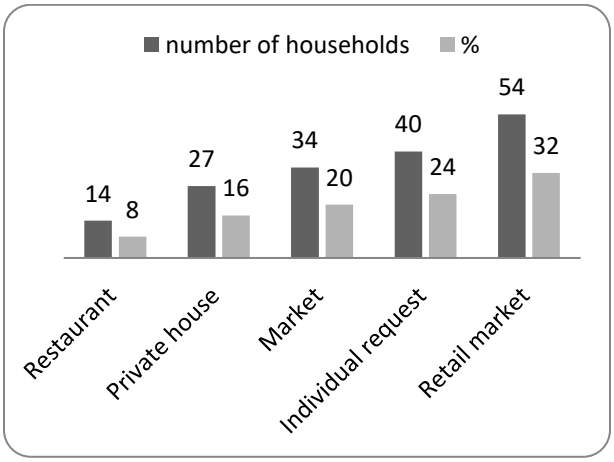


Figure 4. Place of marketing of cottage cheese.

The selling price of cottage cheese produced in traditional way is shown in Fig. 5. The selling price of cottage cheeses varies between 1.5 €/kg to 3 €/kg.

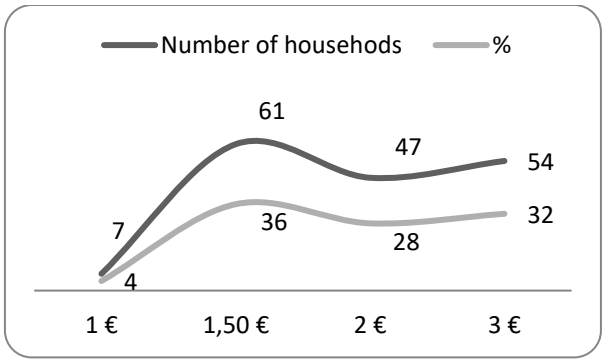


Figure 5. The selling price of cottage cheese.

Sweet cottage cheese: Sweet cottage cheese is the most used cottage cheese, and it is spread all over Kosovo. There are identified three ways of SCC production, which differs in coagulation process (self- fermentation, rennet and yogurt). The technological process of production of SCC by self- fermentation is shown in Fig. 6, while Fig. 7 shows the technological process of production of SCC by using rennet and yogurt.

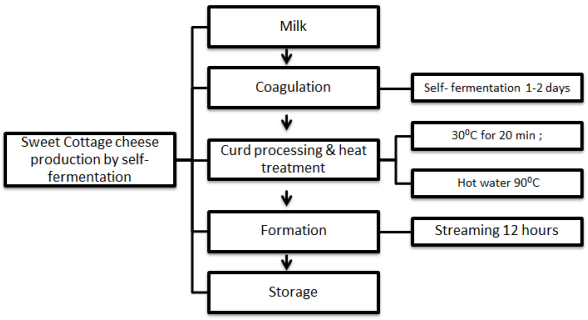


Figure 6. Technological process of SCC production by self- fermentation

SCC by self-fermentation: Fresh milk was placed in containers and it was left at room temperature to self-ferment for 1-2 days (depending on the season, during the summer for one day and during the winter for two days). When milk is left to self- ferment there are produced cram and the curd, while the cream

during cottage cheese production is removed. After the cream is removed, comes curd processing, which was done in two ways, was treated with low temperature (about 30°C) for 20 minutes and it was cut so the whey comes out, or hot water (90ºC) was added and in same time gently stirring, than it is left at rest until the curd is precipitated. Next, it was drained for 12 hours (Fig. 6).

SCC by rennet or yogurt: The fresh milk is thermally treated (depending of what was used, for fermentation rennet 30ºC, and for yogurt 80ºC,) and then rennet or yogurt is added and the milk is coagulated. Curd was cut with the intention of removing the whey. The cottage cheese is drained for 4-12 hours (Fig. 7).

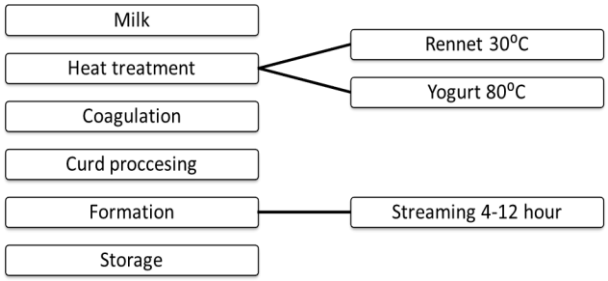


Figure 7. The technological process of SCC by rennet/yogurt

Buttermilk cottage cheese: Buttermilk obtained as by-product during the beating of cream for butter production. Milk is added in buttermilk which is then treated at high temperature just before boiling (90-95°C) for several minutes. Next temperature is set at 60C and is left in those temperatures for 10-12 hours. During this period again the milk is added and the measure is stir, in meantime the coagulation of curd happened and the amount of curd in container is reduced. After the curd formation it is cooled than drained up to two days when it was ready for consumption (Fig. 8).

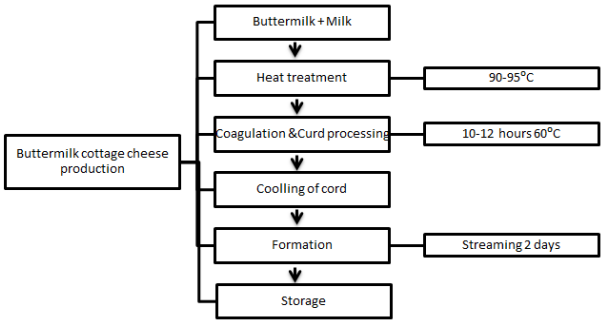


Figure 8. The technological process of Buttermilk cottage cheese.

The study shows that two types of cottage cheese are produced in traditional way in Kosovo. There were slightly differences in curd production between regions of Kosovo mainly in the coagulation process, where in region of Gjilan, Prishtine and Mitrovice like a coagulation form self-fermentation and rennet were used, while in region of Peja, Gjakova and Prizren for milk coagulation were used rennet, yogurt, and coagulation by buttermilk (Prizren region). Even though there were identify two types of cottage cheese, mainly one type of cottage cheese was produce (except in the region of Prizren there were met two types), and this tells a lack of diversity on cottage cheese production in traditional way. According Bytyqi et al. (2017) the lack of cheeses production diversity can be explained by the fact that Kosovo is a small country and cheese production habits are almost similar and there is a lack of knowledge about the cheese production. Except the lack in the diversity of Cottage Cheese, the machinery used for cottage cheese production is very simple or there is no machinery. Usually cottage cheese is produced using households equipment and undergoes a few number of steps or stages of preparation. Pasteurization is really important stage in cheese production, especially in cottage cheese as it is consumed without aging, thus milk used must be pasteurized to ensure the safety of the cheese. It was shown that a large amount of cottage cheese (55.1%) is produced without

milk pasteurization that can be a food safety hazard. Application of pasteurization at such low level in cheese production could potentially be a problem on food safety, in particular when knowing the fact that there was reported a few cases of animal diseases, presence of pathogenic bacteria, i.e., *Staphylococcus aureus, Listeria monocytogenes, Brucella spp*., etc. (Bytyqi et al. 2017). Cottage cheese is one of the products of animal origin produced and consumed on a large scale in Kosovo. Our study shows that the cottage cheeses that is produced in the traditional way except household consumption was also marketed (Fig. 3). The selling price of cottage cheeses varies between 1.5 €/kg to 3 €/kg. These changes in the price depended on the type of cottage cheese, as well as the place of their sales. Mostly, sweet cottage cheese produced with self-fermentation has a lower price, while buttermilk cottage cheese has higher price (3 €/kg). The period when cottage cheese is mostly sold was during the summer.

Conclusions

Production of cottage cheese in Kosovo in traditional way is very high, but it is evident lack of cottage cheese diversity. As a result of very small diversity of cottage cheese in Kosovo, the technological process of production of cottage cheese is almost the same throughout Kosovo. Cottage cheese is one of the products of animal origin produced and consumed on a large scale in Kosovo, therefore it is important monitoring its technological process of production. Improvement of curd production techniques while maintaining the traditional form of its production would improve the product quality and increase the product marketing.

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